

HAMADRYAD

11 No : 3

SEPTEMBER 1986



H A M A D R Y A D

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NEWS FROM THE MADRAS CROCODILE BANK

Representatives of the National Council for Conservation of Wildlife, Pakistan have asked the Crocodile Bank to supply them with mugger crocodiles for their restocking programme. If permission is forthcoming from the Government of India, the Crocodile Bank will give Pakistan 500 mugger, charging only reimbursement for feed and maintenance. We feel that this is an excellent opportunity for some crocodile diplomacy and is also in the interests of wildlife conservation. Crocodiles are almost extinct in Pakistan.

New arrivals at the Crocodile Bank include 5 Tomistoma schlegeli, 10 Nile crocodiles, an assistant manager (Noel Adams). Two volunteers have been of active help: Chandini Menon, who is keeping turtle records and helping in the office, and Paul White who is working on the mugger research programme.

Visitors included Dr Herndon Dowling, Department of Zoology, New York University. Dr Dowling will be spending five months in Burma from October on.

A new mugger breeding enclosure- Pit 16- is being built. It is 100 ft in circumference, and will be our third palustris breeding pit.

The Crocodile Bank is giving four juvenile South American iguanas to the Nehru Zoological Park in Hyderabad.

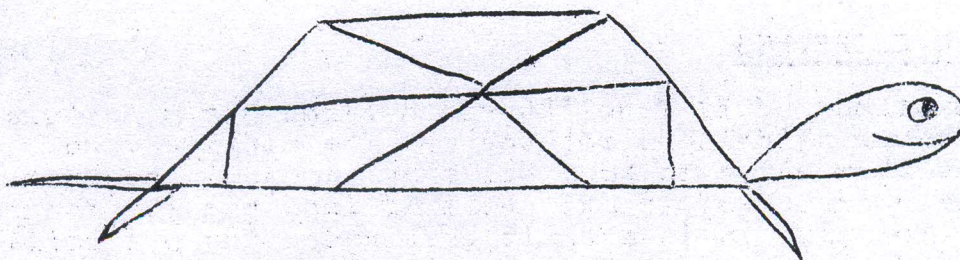
NEWSPAPER CLIPPINGS

"Newstime" of 27 June '86 had a large photo feature of a snake catcher skinning a rat snake. The caption read: 'He skins them alive to keep his body and soul together. May be, it is a cruel way to eke out a living, but for the snake catcher, Pochalu, it is a craft that keeps the pot boiling. The skin of the rat snake, the non-poisonous mate of the cobra (sic), has big sale value. The hand bags, waist belts and purses of the fashion-conscious elite are shaped out of the skin of the snake, which if alive would make them shudder and shiver. Pochalu is a resident of Makhdoompur village in Karimnagar district whose main occupation is selling snake skin. Each snake skin puts in his pocket Rs 10 to 15 and when it rains he would be earning Rs 600 to 700 a month. His trade was faring well during this rainy season as the snakes came out into the open due to the cold and slither straight into his hands and knife-edge. And sad, that Pochalu does not know what a crime he is committing against nature...'

"Thinamani Daily News of 10.9.86 (translation from Tamil): 'Mrs Parvathi Ammal aged 55 from Kotlakulam village near Thiruvannamalai was bitten by a cobra. She was admitted to the Sangam Govt Hospital but died the same day. According to the Sangam Police, the same lady was bitten by a cobra a year ago. And twenty years back, her husband died from snakebite.'

"Indian Express", 7.7.86.- DELHI ZOO DIRECTOR LEAVES HOSPITAL. 'Delhi zoo director Kamal Naidu, who was last week bitten by a deadly black cobra and admitted to hospital, has been discharged. Mr Naidu, 47, has been playing with snakes and scorpions since he was 13 and was earlier bitten by a python, but his never-say-die instinct kept him going, although he admitted a python was not a very venomous reptile.

'Recounting his recent experience, he said he was very disappointed with the scant medical attention he received at the All India Institute of Medical Sciences where he first went after being bitten by the snake- He said after a delay of 45 minutes a junior doctor informed him that he could not be administered the anti-snake venom as the hospital had none. A senior doctor at Safdarjung hospital said when Mr Naidu came walking to the hospital, peripheral cyanosis had already set in. Cyanosis is a bluish colouration of the skin caused by insufficient oxygen intake and supply to body tissues. Doctors at the intensive care unit of the hospital, where he was admitted, said he had arrived 'just before it was too late.' They said he was on the verge of collapse with uncontrollable breathlessness and drooping eyelids.



A SURVEY OF THE BATAGUR TURTLE OF THE SUNDERBANS WITH NOTES ON OTHER REPTILES

The decline of the batagur turtle or river terrapin (Batagur baska) populations almost throughout its range is evident from a review of literature. Blyth (in Gunther, 1864) mentioned that the species abounded at the mouth of the Hooghly (in West Bengal) and great numbers were brought to Calcutta for food. Maxwell (1911) reported two large populations from the Irrawaddy river of Burma, and mentioned that both eggs and flesh were in demand. In Malaysia, the predominant religion being Islam, turtles are considered unfit to be eaten, but eggs are relished, and prior to the Second World War, the country's turtle population was several times larger (Loch, 1950). The present status of the batagur is unclear in many parts of its range. In the Indian sub-continent, the species was considered extinct till recently, when some numbers were found being kept in village ponds in the Sunderbans of Bangladesh (Whitaker, 1982) and of India (Moll, 1985). In Burma, there appears to have been a near total population collapse; a UNDP team found only a small nesting site along the Irrawaddy, where 3 or 4 batagur still nested (Moll, op cit.). Therefore, calling batagur 'endangered' is justified as it reflects the existing knowledge of the status of the species. Once common and an important protein - rich food in the diet of the local people of south and southeast Asia, it has, through unrestrained exploitation, seriously declined.

In India, the batagur is restricted to the Sunderbans, a mangrove forest situated at the mouth of the Ganga, in West Bengal. In this inhospitable land, freshwater inflow is almost absent. High salinity has discouraged settlers and only in the west, near Hooghly or further north, are human settlements to be found. In contrast, the Sunderbans on the Bangladesh side receives a much greater inflow of freshwater and as a result, organisms that are less saline resistant, such as the sundari tree (Heritiera fomes), which probably gives the region its name, are more common. Under Project Tiger a 2,585 sq.km. area has been gazetted in the Indian Sunderbans as a Tiger Reserve in 1972 and within it's 1,330 sq. km. core area or wilderness zone, all human activities are prohibited. Dense human population characterizes the outer limits of the Reserve, many of the inhabitants depending on the forest for their livelihood. Every year, approximately 5,000 people are given permits by the Project Tiger authorities to enter the buffer area for fishing, tree felling and honey collecting.

The Survey

Since October 1985, I have commenced work on a research project on the batagur in this saline wetland, with support from World Wildlife Fund - India. Despite being a far-ranging species which extend from the Sunderbans of West Bengal and Bangladesh, eastwards to the Indo-Chinese region, it is listed as 'endangered' due to exploitation of eggs and adults plus habitat disturbance and destruction in much of its range by the IUCN Red Data Book* (Groombridge, 1982). The batagur is also listed under Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), signifying that the species is threatened with extinction and international trade is prohibited by states ratifying CITES.

Survey findings

In the past, batagur used to range far up the Ganga but evidently as a result of human activities - exploitation of adults, robbing of nests and clearing of riverside vegetation, populations have shrunk and at present, the species is confined to the Sunderbans, where the hostile nature of land and the creation of a Tiger Reserve have made batagur /the country free of excessive human interference.

Nesting

In the Sunderbans, areas suitable for nesting - sandy sea beaches and large sandpits, occur in the sea face. This is similar to the nesting situation in Burma, where Maxwell (1911) mentioned that batagur nest on sandy beaches near the sea. In contrast batagur from the Perak, Kedah and Trengganu rivers of Malaysia nest on sand islands and sand banks which are located beyond tidal influence and they migrate upstream to nest (Moll, 1980). Sandy substrate, other than sea faces, are absent in the Sunderbans. As in Burma and Malaysia, nesting takes place after the abatement of monsoon flooding, in early winter. In the Sunderbans, batagur nest between late November and January, commencing well before the ridley sea turtle (*Lepidochelys olivacea*), which start laying from late December, but continue till early March. However, ridleys are far more common than batagurs. The population of the latter is resident to the area and therefore subject to exploitation throughout the year, in all stages of their lives. Probably as a consequence of this, batagur nests are now much less numerous. Eggs of both these coastal nesting turtles are being taken by fishermen and woodcutters, who enter the Sunderbans, from the beaches of Mechua, Kedo and Kanak. The last mentioned site was a 1.5 sq. km. sandpit at the Matla river mouth, which was swept away by floods in 1984. Fishermen familiar with the area describe mini - arribadas, involving some 100 ridleys, at Kanak prior to that year. Reports of isolated nesting by batagur also exist for Nagbarachar, situated close to Sandhead, where fishing activities are heavy.

Predation on batagur and ridley turtles

Adult batagur are occasionally caught in offshore nets off Bakkhali, Sandhead and possibly other areas in the western part of the Indian Sunderbans, as well, for trade purposes, along with olive ridleys.

** this does not mean that the RDB exploited the eggs!

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In February 1986, several ridleys were seen being transported to Sandhead in mechanised boats by fishermen. To restrict the turtles' movement, they are kept upside down with the flippers tied with a rope. Another rope was passed through a wire-ring drilled into the suprapygial - vertebral juncture of the carapace. Additionally, the eyes are sometimes blinded. In winter, during the turtle landing season, Sandhead becomes a grave-yard as dead and dying ridleys are strewn on the beach and in and around the fishing village. Behind habitations, fishermen dig deep pits to store ridleys, and apparently also batagurs, which are to be eventually sold to the visiting agents of the 'aratdars' (godown-owners) of Sagar island. Turtles are sold in Namkhana, Kakdwip, Diamond Harbour and other large markets in the area, and some numbers are slipped into Calcutta, despite the checkpoint at Namkhana. Additional checkpoints should be established at Diamond Harbour and/or Kakdwip, between October and March every year, to snap this link, and patrolling of the seas off Sandhead and neighbouring areas to stop the capture of turtles is recommended. While in Sandhead in February 1986, I was told that a batagur was being kept for sale at an 'arat' in Sagar island, but could not visit the place because of communication problems. In the western Sunderbans, outside the Tiger Reserve, an estimated 2,000 ridleys are annually caught for sale in the markets of lower Bengal.

Protection

In the last two years, the West Bengal Forest Department and Project Tiger authorities have stepped up their campaign against the turtle trade. Fishermen are warned of prosecution if they catch turtles and leaflets produced by the WWF - India are being distributed. At Port Canning, once an important ridley market, the Project Tiger authorities have been successful in stopping the trade. Scores of old ridley shells are kept stacked on top of fish stalls at the market to function as roofs, but no fresh shells join them.

North of the Tiger Reserve, some of the comparatively affluent villagers are keeping river terrapins as pets, in village ponds. One such village is Kumirmari, where the Baghna Range Office is situated. Captive terrapins feed on the aquatic vegetation growing in the ponds, such as Cynodon dactylon and Ipomoea reptans, supplementing their diet with other vegetation or animal matter like prawns which are provided by their owners. Captive river terrapins are either hatched from eggs collected from nesting grounds or trapped in funnel-shaped nets generally used in catching the valuable tiger prawns (Penaeus monodon). Locally, the river terrapin is called 'katha' or 'bala katha', while the ridley is referred to as 'samudrik katha'.

Other turtles

The commonest turtle in the Sunderbans is possibly the indo-gangetic flapshell turtle (Lissemys punctata andersoni), found in freshwater ponds and creeks low in salinity in the northern and western parts of the Indian Sunderbans. However, this species is under considerable pressure as large numbers are caught by nets, hooks or by hand, being initially located by jabbing shallow waters or mud with

an iron-tipped stick. One enterprising villager in Kumirmari island even attempted to breed the species for commercial purposes, in a large pond. Eggs were reportedly laid in the month of 'Ashar' (June-July), clutch size being 10-16. Mongoose, possibly Herpestes edwardsi was a major egg-predator, and apparently had little difficulty in scaling the metre-high compound wall. During a monsoon flood some years back due to negligence on the part of the owner, all turtles escaped and the entire venture was abandoned.

In November 1985, a single specimen of the Indian roofed turtle (Kachuga tecta) was collected from Arbesi Compartment 3, close to the Bangladesh border by a fisherman, and deposited at the Sajnekhali ridley hatchery. This was a sub-adult female with a straight carapace length of 15.1 cm. As this emydid turtle has not been recorded from the Sunderbans of India previously, it is, in all probability, a stray. Otherwise, this species is found in the flooded paddyfields of several parts of southern Bengal, from where the present specimen may have come.

Of the Asian giant softshell turtle (Pelochelys bibroni), no evidence could be found in the Indian Sunderbans. Smith (1931) doubted its existence from Bengal though Fugler (1984) and Khan (1982) mention its occurrence from Bangladesh, previously a part of Bengal. This estuarine trionychid was recorded once from the vicinity of Mandapam in the Palk Bay (Nair and Badrudeen, 1975) with other records from the Subarnarekha river at Udaipur village, Orissa (Moll, 1985) and Gahir-matha coast, Orissa (Vijaya, 1982). Pritchard (1979), however, included neither India nor Bangladesh in the distribution of this far-ranging species.

Other reptiles and amphibians

The herpetofauna of the Sunderbans have been commented on by numerous authors, but there appears to have been no long-term studies on any species, with the possible exception of the saltwater crocodile (Crocodylus porosus). The water monitor (Varanus salvator), yellow monitor (V. flavescens) and common monitor (V. bengalensis) are the three found in the Sunderbans of West Bengal, the first species generally considered to be destructive to nesting openbill storks (Anastomus oscitans), damaging both eggs and fledglings, and also the eggs of the coastal nesting turtles.

Snakes of several species have been recorded from the Sunderbans, the commonest venomous snake being the monocled cobra (Naja naja kaouthia). Several authors have reported the king cobra (Ophiophagus hannah) from the Sunderbans of West Bengal, but during the present field work and on several visits to the area prior to it, no sighting was made, and neither could locals and other reliable people familiar with the area describe the species. There are also reliable accounts of king cobras in the Bangladesh Sunderbans. I could also find no recorded cases of king cobra bite or capture from the study area, and there are no specimens of the king cobra collected from the Indian Sunderbans in the large collection of snakes at the National Zoological Collection, Zoological Survey of India at Calcutta.

Amphibian life of the Sunderbans of West Bengal includes perhaps less than half a dozen species and as might be expected all are anurans: the common toad (Bufo melanostictus) Indian bull frog (Rana tigerina), skipping or skittering frog (R. cyanophlyctis) and cricket frog or paddy frog (R. limnocharis). Also known from this region is the tree frog (Rhacophorus maculatus). Interestingly, Neill (1958:68-69) stated that the family Rhacophoridae is apparently unrepresented in saltwater areas. I found only the saline-resistant cricket or paddy frog to be common in the vicinity of brackish-water ponds, north of the Tiger Reserve. About its habits, Finn (1929) mentioned that it is remarkable among amphibians in readily taking to brackish or even saltwater.

Acknowledgements

Support for field work in the Sunderbans of West Bengal was provided by World Wildlife Fund - India. I am indebted to a large number of persons associated with the survey, including Ms. Bonani Kakkar, Project/Education Officer, WWF-India (Eastern Region) for getting the project started and Mr. Kushal Mookerjee and Mr. Jonathan A. Rao for help received in the field. Since the inception of the project, I have had the good fortune of receiving advice and encouragement from Dr. Edward O. Moll of the Eastern Illinois University. I also wish to thank the officials of the West Bengal Forest Department, in particular Mr. Subimal Roy, Conservator - Wildlife Circle and Mr. Pranabesh Sanyal, Field Director, Sunderbans Tiger Reserve, for the logistical support received. Lastly, I wish to thank Dr. G.P. Bhatnagar, Professor and Head, Department of Limnology, University of Bhopal, for reading the manuscript.

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TURTLE NOTES FROM KUKRAIL

In October 1985 the author observed a 24 cm long Gangetic soft shell (Trionyx gangeticus) in the clutches of a mugger (Crocodylus palustris) in the Kukrail river. The crocodile had seized the left posterior edge of the turtle's carapace and the victim was tugging furiously in an effort to escape. It was rescued with a net. The wound, on closer inspection, was 4.5 cm deep and was bleeding slightly. The turtle was later released in a pond at the Crocodile Breeding Centre in Kukrail.

Talking about T. gangeticus, we have had several opportunities to observe them mating in the river. The most recent instance was on 23rd June this year. Our observations indicate that the species prefers to mate in shallow water (about 15-30 cms deep).

While on the subject of turtles a recent batch of Kachuga kachuga hatchlings at the Centre include one without any eyes and one hatchling with a single eye.

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FOREST CHELONIANS OF GOA

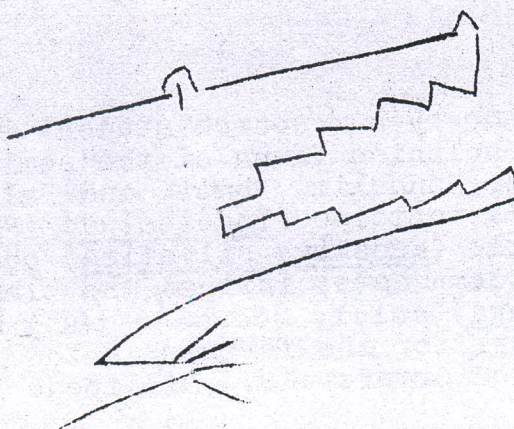
A one week trip was made by a research student to Goa between 23-29 June to look at the chelonian fauna of the semi-evergreen and deciduous forests of Valpoi, Sonaulim, Bhatti and Salginim. It was found that neither Forsten's tortoise (Indotestudo (Geichelone) forstenii) or the cane turtle (Heosemys silvatica) occurred on these windward slopes of the Western Ghats; instead, the black pond turtle (Melanochelys trijuga trijuga) solely occupies the niche of these chelonians. They leave water for the forests in the rainy months of June-July, where they feed on arthropods. Millipede remains were found in the forest.

There are no tribals living in Goa; however people from the villages near the forest often feed on the black pond turtle. Shells were recovered from the village surroundings and one semi-adult was obtained from a house where it was being kept as a pet.

In the summer months villagers report that they have seen Melanochelys trijuga trijuga basking on the banks of streams and rivers.

Plenty of Malabar flying frogs (Rhacophorus malabaricus) were found calling in large numbers from tree branches over water pools at Colem - obviously it was their breeding season.

MADRAS CROCODILE BANK.



MUGGER, CAIMAN AND SALTWATER CROCODILE BREEDING AT THE
MADRAS CROCODILE BANK- 1986

Tables I to V show nest and hatching data for 1986, for the three species of crocodilians which bred at the Croc Bank this year.

Table I - Pit No. 8 (Mugger)

<u>Female</u>	<u>Date of laying</u>	<u>No. of eggs</u>	<u>Infertile eggs</u>	<u>Hatching %</u>
Misty	20.2.	35	1	97
Vijaya	9.3	28	1	96.3
Stumpy	10.3	32	1	96.8
981	13.3	28	8	85
Blackie	13.3	29	1	68.7
Unknown	?	31	2	86.2
Unknown	?	20	5	100

IInd Nesting

Stumpy	22.4	19	3	76.6
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Age of females: 10 to 15 1/2 years
Stocking rate: 1 male : 6 females

Table II - Pit No. 10 (Mugger)

<u>Female</u>	<u>Date of laying</u>	<u>No. of eggs</u>	<u>Infertile eggs</u>	<u>Hatching %</u>
Amara	1.2	29	5	0
980	4.2	27	0	77.7
984	15.2	24	7	64
220	19.2	32	15	76.5
073	19.2	30	1	86
091	25.2	27	6	76.2
120	26.2	21	3	61.1
237	27.2	26	7	94.4
977	3.3	18	8	0
133	4.3	27	0	100
978	5.3	15	12	66.7
Nova	5.3	32	2	96.7
624	14.3	29	13	68.7

Ind nesting

980	11.3	19	4	100
984	21.3	20	3	82.3
Amara	28.3	26	7	0
978	31.3	10	10	0
237	31.3	15	3	83.3
073	3.4	19	1	72.2
091	14.4	16	6	40
Nova	4.5	19	0	94.7

Age of females : 11 - 25 years

Stocking rate : 2 males : 16 females

Table III - Pit 20 (Mugger)

<u>Female</u>	<u>Date of laying</u>	<u>No. of eggs</u>	<u>Infertile eggs</u>	<u>Hatching %</u>
018	15.2	19	19	0
425	1.3	17	3	94.1
086	4.3	23	12	90.9
607	6.3	11	2	77.8
982	7.3	17	17	0
153	11.3	20	20	0
107	24.3	22	22	0
?	?	15	15	0

Age of females : 8-10 years

Stocking rate : 2 males: 36 females

Table IV - Caiman

<u>Female</u>	<u>Date of laying</u>	<u>No. of eggs</u>	<u>Infertile eggs</u>	<u>Hatching %</u>
100	20.3	29	0	89.6
1000	17.4	41	3	94.7
600	18.4	32	1	80.6
900	29.4	32	0	65.6
200	3.5	25	2	90.9

Table V-- Saltwater crocodile

<u>No. of nests</u>	<u>Date of laying</u>	<u>No. of eggs</u>	<u>Infertile eggs</u>	<u>Hatching %</u>
1	18.4	57	3	100

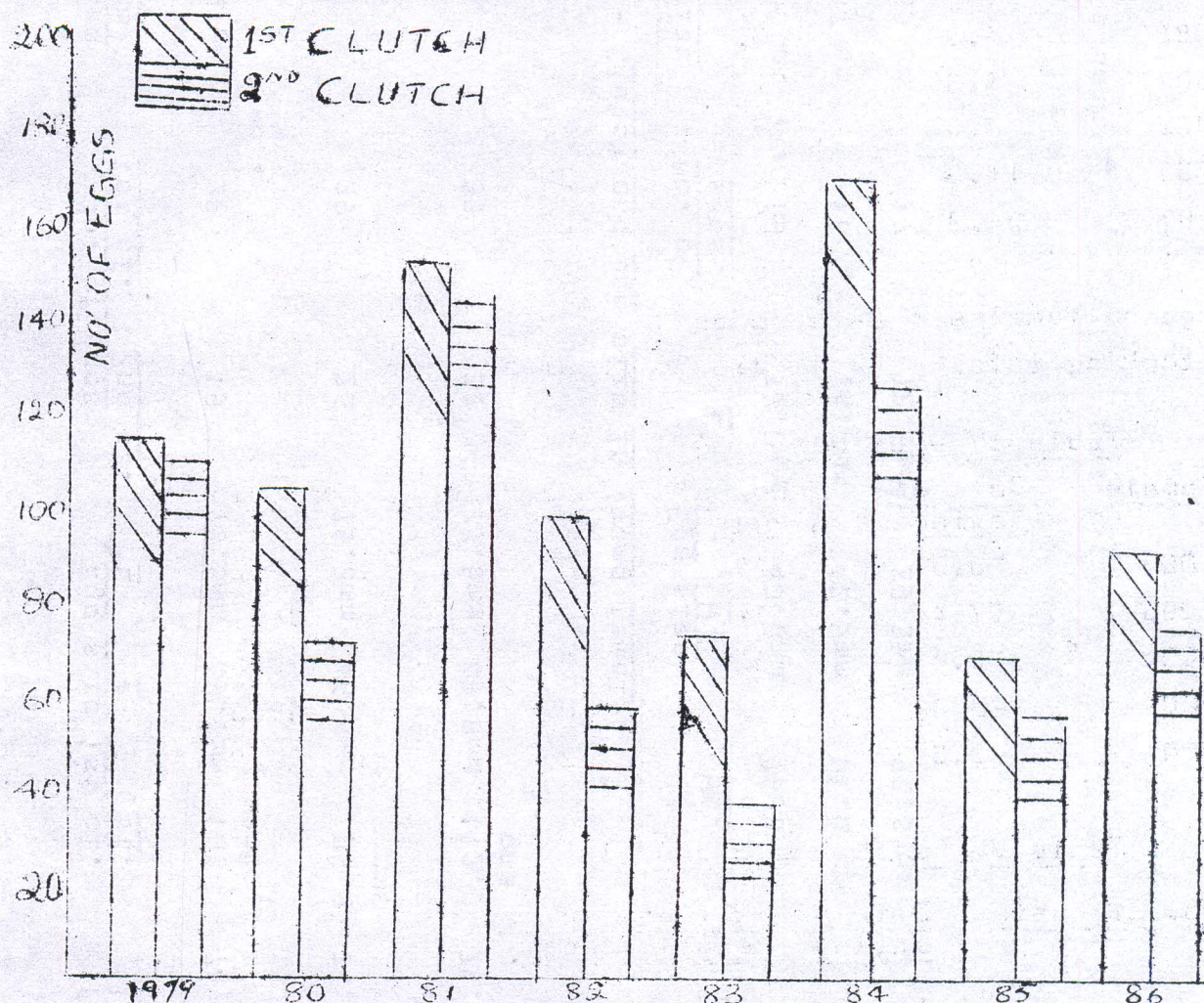
Stocking rate : 1 male : 1 female

Harry Andrews
Curator
Madras Crocodile Bank

VARIATION IN EGG AND CLUTCH SIZE OF MUGGER IN DIFFERENT AGE GROUPS

The Madras Crocodile Bank has bred mugger for the past ten years. As a general rule, we find that clutch and egg size is proportionate to the size and age of the female, although there have been some notable exceptions. This variation in size is also apparent in females that double-clutch; the second nesting tends to produce smaller and fewer eggs than the first.

Table I shows size variation between 1st and 2nd clutches.



Females have been laying larger clutches every year, though some females sometimes lay smaller clutches, then 'make up' in the following season with larger clutches. This feature may be an outcome of the social structure in the breeding enclosure.

Older, larger females lay larger clutches and bigger and more viable eggs compared to younger females new to the game. Females nesting for the first time lay smaller clutches and eggs and the fertility rate is low in most cases.

Tables II and III show clutch and egg size variation in older and in younger females.

Table II - Clutch and egg size variation in older females

No.	Age (yrs)	Size (cm)	No. of eggs		Egg size 1st cl.		Egg size 2nd cl.		Infertile eggs
			1st cl.	2nd cl.	L	Wt.	L	Wt.	
1	25	210 cm	32	19	75.5mm	49.7mm 106 gms	74.2mm	50.5mm 104.2 gms	2
2	16	232	29	26	75.3mm	46.4mm 96.8 gms	74.3mm	46.4mm 93.8 gms	5
3	15	250	33	32	77.5mm	49.8mm 112.2 gms	71.9mm	46.6mm 92.2 gms	4

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Table III - Clutch and egg size in young females

No.	Age (yrs)	Size	No. of eggs		Egg size		Infertile eggs
			L	Wt.	L	Wt.	
1	9	180 cm	19	77.0mm	40.8mm	79.3 gm	19
2	10	187 cm	18	74.4mm	42.9mm	81.8 gm	8
3	9	185 cm	17	78.6mm	39.3mm	92.6 gm	3

Harry Andrews
Curator
Madras Crocodile Bank

ELUSIVE CROCODILE TRAPPED

(from the M.P. Chronicle, Bhopal, July 22, 1986)

A five-foot crocodile, which had mysteriously escaped from the local Aquarium and sneaked into the Lower lake creating panic among the people living on the banks of the lake, was caught in a residential locality near the City Corporation library. The crocodile had eluded the officials of fisheries and Wild Life departments for the last two weeks and efforts had been made on warfooting (sic) to trap it.

On receiving the information that the fugitive crocodile was spotted near the Acharya Narendra Dev Library, the officials of (the) Police & Fisheries Departments rushed to the spot. The crocodile was lying on the steps in one corner of the ground there. Meanwhile, the police force and chowkidar of the library kept a watch on the crocodile. Later, the officials of (the) Police & Fisheries Departments trapped him under the net and (he) was covered by a bag till the arrival of Dr Rao, an expert and two of his assistants of National Chambal Crocodile Sanctuary.

Later, the crocodile was brought back to the aquarium and has been lodged in old habitat(sic).

Sigh of relief

Following the trapping of the crocodile, the people residing in the adjoining localities have heaved a sigh of relief.

It may be recalled that the disappearance of the crocodile from the government Aquarium had created a scare in the public and a controversy among the fisheries department officials.

Claims, counter claims

The research officer of the Aquarium had tried to elude the public by opining that the crocodile had been stolen but this theory of his was belied as some employees of the Aquarium countered the claim of the research officer. They claimed that the reptile's disappearance was case of negligence.

It may be mentioned here that the search operation of the crocodile, who had slipped into the lower lake, a fortnight ago, had been practically abandoned at the government level two days ago and the crocodile was left free to enjoy his new abode.

The Fisheries department officials, it was stated, had asked the workers engaged in trapping the crocodile, not to risk their lives (going) after the reptile. However, it is stated that following the receipt of the news that the trapping operation of the crocodile had been abandoned, there was resentment in the public, particularly among the people residing in the lower Lake vicinity. Scenting the angry mood of the public, the authorities had second thoughts, made another bid to trap the crocodile and sought the services of Dr R J Rao of the National Chambal Sanctuary. And they succeeded at last.

GHARIAL CONSERVATION IN THE NATIONAL CHAMBAL SANCTUARY

The Chambal river is one of the best remaining habitats for the gharial (Gavialis gangeticus) in its range. The National Chambal Sanctuary extends along the Chambal river from Jawahar Sagar dam (Rajasthan) to Kota barrage and, after a gap of 18 km, from Kasheraipatan (Rajasthan) through Pali (Madhya Pradesh, Rajasthan) to Pachhanada (Uttar Pradesh). Other aquatic fauna such as freshwater turtles, otters and river dolphins in the Chambal also receive protection in the Sanctuary. The 'grow and release' scheme of the Crocodile Conservation Project has been adopted by the Forest Departments of Madhya Pradesh and Uttar Pradesh. The former has set up a Gharial Rehabilitation Centre at Deori, Morena and the collection of gharial eggs for hatching at the Centre was started in 1981. Eggs were also collected by the M.P. Forest Department during 1982, 1984 and 1985. During February 1985 a total of ten captive reared gharial of the 1981 batch were released in the Ken Gharial Sanctuary.

The Uttar Pradesh Forest Department, which has a Crocodile Rehabilitation Centre at Lucknow, has so far released over 1000 captive reared gharial into the Chambal river.

A field camp of the Crocodile Research Centre, Wildlife Institute of India, was established at Deori, M.P. during 1983 to undertake a detailed study of gharial ecology in the National Chambal Sanctuary. Gharial movement on the river was monitored. Detailed surveys in the National Chambal Sanctuary are being continued to locate new nesting grounds and feeding areas of the rehabilitated gharial. So far a total of ten nest sites have been located. They are:

	<u>Nesting ground</u>	<u>No. of nests</u>	<u>State boundary</u>
1.	Bagdia Sond	1	M.P.
2.	Gobarda	1	M.P.
3.	Baroli	14	M.P. + Raj.
4.	Nadigoan	2	M.P.
5.	Banwara	1	Raj.
6.	Bharra	5	M.P. + Island
7.	Tigri Rethora	5	M.P.
8.	Purcini	1	Raj.
9.	Barsala	4	M.P.
10.	Gyanpura	1 (??)	U.P.
T o t a l --		36	

75% of the nests were in M.P., 8% in Rajasthan, 2% in U.P. and 11% on an island shared by M.P. and Rajasthan. A total number of 465 eggs in 14 nests were collected this year by the U.P. Forest Department for their 'grow and release' programme.

I am grateful to the Director, Wildlife Institute of India for allowing me to conduct research studies as a Research Fellow of the Institute. Thanks are due to Dr L.A.K. Singh for his encouragement.

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CROCODILE SURVEY IN THE GIR SANCTUARY, GUJARAT

I am writing to give you the results of some crocodile counts done in the Gir by Binod Choudhury, B.K. Pandya and myself in May. This year Saurashtra has had one of the worst droughts of this century and the water level in all the reservoirs is very low. In the censused area, Kamleshwar, water has been reduced to two small pools and a single large U-shaped lake. Here are the figures:

Results of 7 counts

<u>Date</u>	<u>Time</u>	<u>Duration</u>	<u>Location</u>	<u>No. of crocs</u>	<u>Remarks</u>
13.5.86	2200-2330 hrs	90 min	Lake	112	Cloudy, dark night. Torchlight.
14.5.86	2200-2330 hrs	90 min	2 small pools	14	Cloudy, dark night. Torch- light
17.5.86	0945-1230 hrs	165 min	Lake 2 small pools	82 7	Bright sunny day
18.5.86	1700-1905 hrs	125 min	Lake 2 small pools	91 7	
18.5.86	2010-2230 hrs	140 min	Lake 2 small pools	93 18	Torchlight
18.5.86	2010-2230 hrs	80 min	Lake 2 small pools	146 28	Torchlight
21.5.86	2145-2345 hrs	120 min	Lake 2 small pools ::17::	125 14	Torchlight

Independent counts by BC, RC and BRP

Date: 17.5.86

Time: 2130 - 1230 hrs

Location: Kamaleshwar Hiran dam

Remarks Half moon, brightly lit, partially cloudy

<u>Surveyor</u>	<u>Lake</u>	<u>Small pools</u>	<u>Total no. crocs</u>
B C	148	23	171
B R P	113	18	131
R C	146	17	163

Average count - 17.5.86

Lake : 136

Small pools: 19

Average of 7 counts (13-21.5.86)

Lake : 108

Small pools: 15

Total: 123

17 nests were located in the reservoir, (making it the largest known single nesting population of mugger in India) 4 in another location (Muggeria Gunna on the Macchundheri river) and one by the side of a deep pool at Pilipat.

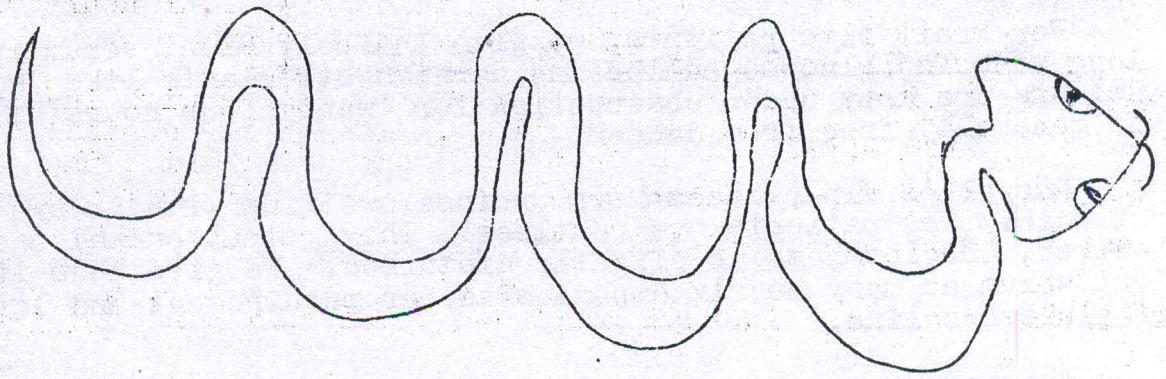
Ravi Chellam
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CAIMAN BRED AT THE KUKRAIL CROCODILE BREEDING CENTRE, LUCKNOW, U.P.

A pair of South American caiman (Caiman crocodilus) received from the Madras Crocodile Bank in 1981, bred at the Kukrail Centre for the first time in 1986. The female laid 32 eggs of which 5 were infertile. 25 hatchlings resulted for a 92.6% hatching rate. The eggs were transferred to a wooden box filled with sand soon after laying and kept at 29° - 34° C. The sand was periodically moistened. Most of the hatchlings needed some assistance in breaking out of the egg.

The author appreciates the advice and support of Mr R S Bhaduria (Conservator, Wildlife, Uttar Pradesh) in this successful breeding of the caiman. The only other centre breeding this species in India is the Crocodile Bank.

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This paper was presented at the August 1977 symposium, The Diagnosis and Treatment of Snakebite in India organised by the Madras Snake Park and the Indian Pharmacological Society. The author is Dr.B.W.Athawale, The New Clinic, Devgad, Ratnagiri District, Maharashtra.

SNAKE-BITE CASES

Snake-bite cases are quite common in Devgad Taluka. Devgad is famous for 'SNAKES'. Every year thousands of saw-scaled vipers (Echis carinatus) are sent from here to Haffkine Institute, Bombay. Almost every doctor from this Taluka gets at least a few cases of snake-bite. We would like to introduce here a few salient features about snakes and snakebite treatment in our district. The present article is based on our own findings during the last eighteen years or so.

Occurrence: Snakes are common in all seasons throughout the year; they are more prevalent in September and October and April and May.

They are common during day-time in fields; they are seen at night time in residential areas.

Common poisonous varieties in the order of prevalence:

1. Saw-scaled viper
2. Krait
3. Russell's viper
4. Cobra

Common locations:

1. Different holes (in fields etc.): cobra
2. Under stones: saw-scaled viper
3. Damp and muddy places: Russell's viper
4. Around and in houses: krait, cobra

Common sites of bites:

1. Hands and feet:
Hands: Particularly webs and fingers
Feet: Webs and toes, heels. Very rarely above ankle joint.
2. Occasionally other locations like back (in shoulder region). Usually thighs and trunk and the parts above neck are free from bites.

For krait bite patients, we give Inj.polyvalent serum intravenously along with Inj.glucose-saline and cardiac stimulants like Inj.coramine. Patients are kept under observation for twenty four hours after, when they are generally free from danger.

Russell's viper cases have profuse swelling with induration, darkening and pain. The patients are restless. They get abdominal and leg cramps. However, consciousness is slightly disturbed. We give them i.v. polyvalent serum as many as six ampoules as per requirement and large quantities of glucose-saline.

The cases show improvement within a day or two; however, the swelling persists for a considerable period-many times for a fortnight or so. Then wound sloughs and then heals.

The cases which were fatal showed paralysis of the limbs and respiratory failure. They were conscious till death and died probably due to respiratory and/or circulatory failure.

Cobra bite cases are almost always fatal if not treated promptly and immediately. Due to transport difficulties, valuable time is lost and the victim dies without any medical aid. However, cobra bite cases are fortunately very few as compared with echis bite cases. Even with efficient and prompt medical care, many prove fatal, a few lucky ones survive.

Without wasting a moment, without giving a test-dose, we straight forward start injecting polyvalent serum along with large quantities of glucose-saline. As many as eight to ten ampoules of polyvalent serum have been given depending upon the severity and response.

When large quantities of glucose-saline are required, we generally give Inj.Hemacelle (Hoechst) intravenously as a plasma substitute. In addition to polyvalent serum, we give cortico-steroids like Inj.Betnesol, In.Decadron, antihistamines like Inj.Piriton, Inj. vil., Inj. Synopen, etc Inj.Cal.Gluconate, Inj.Vit.C, Inj. Carbozochrome or Adrenochromes like stadren etc. Inj.Atropine, Inj.Coramine, Inj.Mickoren, Inj.Aminophylline etc. as per requirement and other symptomatic treatment.

Ligation is helpful as a first-aid measure and we do have recourse to it when possible. We dont take incisions at the site of bite. However, we inject a few ccs of polyvalent serum at the spot. As a routine, we give Inj.Tetanus antitoxin.

As regards anaphylactic or other untoward reaction of Inj.Polyvalent serum, we have seen many cases showing reactions like Rash, Erythemas, Rigors, Profuse perspiration, vomiting, cough, Cyanosis, Cold and Clammy Body, Imperceptible Pulse and even Cardiac Arrest. Of course, it is very difficult to say whether these reactions were due to the serum or due to snake venom or due to something else.

Unusual locations of snakes:

1. Gum boots, boots, closed sandals
2. Near the accelerator of cars
3. Pockets of pants, coats, bags
4. Bundles of firewood or grass
5. Bathroom
6. Bed and mattresses
7. Closed umbrellas
8. Under bicycle seats

Some beliefs prevalent in the area:

1. 'Bite' is always due to some 'sin' on the part of the victim or some unknown cause.

2. Many a time a person escapes 'bites' by chance. Even if the snake is almost near him, he (or she) does not get a 'bite'. On the other hand, some snakes like the Russell's viper jump on the victim and bite him though he is at a considerable distance from the snake.

3. In the case of Echis bite, it is believed that the victim should be kept in a dark, isolated place. He should not hear the sound of bangles, the voice of a woman in her menstrual periods. He should not eat spicy food.

4. There is a short thick snake blackish grey in colour. It is supposed to jump on the victim. It is considered deadly poisonous killing its victim within 24 hours causing him to froth profusely.

5. There is a slender, tiny snake, with a very small 'hood'. It is called 'Dhakshak' - one who kill immediately.

6. It is a common belief that a krait never bites; but its 'shadow' causes poisonous symptoms. Local people believe the shadow of the krait is poisonous not its bite.

We have of course seen and managed cases of 'krait bite'. In each and every case, the cause of the 'bite' was confirmed as that particular snake was brought here along with the victim. In each case, the snake proved to be a krait.

There was one case, where a patrolling policeman had a krait bite. He was on night duty outside the government Treasury. He was wearing sandals and had 'pattis' around his legs. However, a krait jumped on his bayonet from above, travelled along his gun and bit him near his thumb. He was brought along with the krait to the dispensary when I was called for management of the case. He did not show any signs and symptoms of poisoning. However, the bite could be seen distinctly. We administered one dose of polyvalent serum intravenously. He was kept under observation for a day. As he had no abnormal signs and symptoms then, he was discharged. In this case, the 'bite' might not have been sufficient enough to inject poison in lethal dose or there may be some unknown cause.

As for the belief about the poisonous effect of the krait's shadow, this is of course a myth. Some cases have attended our O.P.D. complaining about nausea and a sense of increasing weakness immediately after coming under the so called shadow. On close examination, we could not detect any organic abnormality and therefore, we regarded it as purely of psychic origin.

We had another case of krait poisoning. The victim a male aged 30 years, was sitting at night in an arm chair on the closed verandah of his bungalow, when suddenly, he felt a sharp prick on his back in the shoulder region. He got up and detected a krait which he killed. On examination I could detect marked bradycardia. As I am his family doctor, I already knew that his normal pulse-rate was 70 to 80 p.m. The victim had a sense of paresis in his limbs. Routine treatment was administered throughout the night and gradually he showed improvement and was then free from danger.

This case is illustrated for the unusual site of 'bite' and marked bradycardia.

7. Russell's viper: It is believed that this reptile is seen in damp places like cow-dung and buffalo-dung; in cool places in the house generally near water storage pots, and in bathrooms. This belief is true because generally these seem to be the common sites where this snake can be found.

8. Cobra: There are many beliefs about this snake. A few of them are as follows:

- a) A cobra takes revenge
- b) A cobra is very swift, cunning, shrewd and fearful (timid)
- c) A cobra changes its colour
- d) A cobra is fond of music. It follows a whistle or the sound of a flute.
- e) It 'whistles'
- f) The head survives even if it is cut across from the body.
- g) A cobra is deadly poisonous. The severity of the poison depends on bluish black stripes on its ventral side.
- h) The time between 'bite' and the death of the victim is directly proportional to the number and extent of these stripes.
- i) A cobra is afraid of 'mantrik' and obeys his orders.
- j) Cases of cobra bite can be cured by certain herbs
- k) A cobra seen in a dream is supposed to be a good omen.
- l) At night or late in the evening, the name 'cobra' should not be pronounced. The snake may regard it as a 'call'
- m) There is a guard Russell's viper - one who guards and protects the property of people. It never does any harm to that particular family.

These are some beliefs prevalent in this part. They need to be scrutinized and evaluated properly on scientific basis.

9. Any fruit (mango etc) if licked or bitten by any poisonous snake causes poisonous symptoms. A place where any poisonous snake particularly Russell's viper has put its excreta or saliva, is regarded as a potentially dangerous place; if a person comes in contact with the spot, he gets symptoms like swelling of that part, pain vomiting etc.

As soon as a victim is brought to the hospital, as far as possible, we try to identify the type of reptile which is generally brought along with the victim. However, in each and every case, the snake cannot be seen personally and we have to depend on the victim's or the accompanying person's description about the type of snake. In some cases even they themselves cannot detect the exact source of bite, whether it was a snake or something else.

Such cases are extremely difficult to treat. Many a time, a scratch or a very tiny puncture is seen but some times nothing can be seen. The symptoms are misleading. Victims feel a sense of weakening in the limbs, a sense of paralysis, loss of control, heaviness in head and limbs, tingling sensation at and from the site of supposed 'bite', dryness of mouth or excessive salivation, fretfulness, palpitations, a sense of sinking down. In such circumstances, we find it extremely difficult to decide the line of treatment. Under such circumstances, the best way is to keep the victim under observation, try to maintain his mental strength and morale and to reassure him. We never administer polyvalent serum unless we are sure about the nature of 'bite' - either by way of seeing the snake personally or by way of proper history or a definite snake bite.

When these criteria are fulfilled, we follow the usual line of treatment. Formerly cases of Echis bite were almost always fatal. However, in the last fifteen or twenty years, it is very rare to find a fatal case of Echis bite because polyvalent serum is routine administered to these victims.

On the seventh day after the Echis bite, an old lady was brought here for treatment when she had started considerable bleeding from gums, oral mucosa and kidneys. The site of the bite was also bleeding. Some local doctor had given her an injection of cal. gluconate i.v. There was oozing of blood from that injection spot also. We gave two doses of polyvalent serum along with vitamin C and haemostatic tablets. No other treatment was given and the patient survived.

In cases of Echis bite, there is definite danger of bleeding from various sites of the body and it is likely to prove fatal. However, if we do not find any immediate danger from Echis bite the treatment can be given with ease. We, therefore, administer polyvalent serum after first giving a test dose intramuscularly in lateral gluteal aspect or in lateral aspect of thighs. Intravenous injections usually give reactions like rash all over the body, severe rigors, cold clammy extremities with feeble and fast pulse and almost always vomiting. We find intramuscular injections quite effective in 'established Echis-bite' cases.

(Editor's note: This paper is a brilliant example of how fact and fiction are freely mingled when it comes to snakebite.

EXTENSION OF THE RANGE OF DUMERIL'S BLACK HEADED SNAKE
(Sibynophis subpunctatus)

During studies on snakes of Gujarat State I identified 4 specimens of Sibynophis subpunctatus, a species only once recorded from Dang District in Southern Gujarat.

According to Smith (1943) the range of this species north of Lat 18 is in what is now Maharashtra, Madhya Pradesh and West Bengal. South of Lat 14, it is found in Sri Lanka and Southern India. The present record extends its range considerably. Details of the specimens are given in the accompanying table.

Sibynophis subpunctatus from Gujarat

Date	Coll.by	From	Sex	Total length	Tail length	V	C	SR	Labials
19.8.80	Raju Vyas	Barada Hills Dist.Jamnagar	F	27.5 cms.	5.1 cms.	-	-	17	$\frac{8}{7}$ 3.4.5. touch the eye
15.12.82	RV	Jamnagar City	F	32 cms.	6.6 cms.	263	70	17	$\frac{9}{4.5.6}$ touch the eye
20.10.83	Nitin Vyas	Amargadh Dist.Bhavnagar	M	33.5 cms.	7 cms.	287	85	17	$\frac{9}{9}$ 4.5.6. touch the eye
19.12.86	Satya-jit Khachhar	Baroda City	M	34.8 (tail cut; dead on road)	3	194	20+	17	$\frac{9}{9}$ 5.6. touch the eye

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A DOCUMENTARY ON SNAKEBITE

Last year the 27 minute colour documentary Snakebite! was completed and has since had several showings both in India and out. It was made by Eco Media, a company which makes environmental films (of which I'm a component) and John and Louise Riber, who are veteran film makers. There is so much myth and fairy-tale around the subject of snakebite in India that it proved a tricky business: as I write this, our environmental educationist Rajendran has been sent away by the headmaster of a local school because 'you are teaching my students wrong facts.'

The film's message was therefore deliberately kept as simple as possible: that there are four common dangerous snakes in India, -- that these will only bite if stepped on or otherwise injured, and that antivenom serum is the only cure for snakebite. In our scramble to keep the script as simple as possible, some memorable gaffs resulted such as: (in deep authoratative voice) "Aboce all, avoid dangerous snakes". Easier said than etc.

The film opens with Gopal, the anti-hero, walking home at dusk with his father. The father steps on a cobra. The snake's feelings are naturally hurt but it doesn't bite. Then Gopal takes his sickle and attacks it, and gets bitten. He screams like a banshee and runs. The next scene is at the witch-doctor's where in spite of vigorous chanting etc Gopal dies. This sequence is re-played several times to illustrate why Gopal was bitten and why he died; that is, it tells the audience what not to do.

The film goes on to talk about the natural history of these snakes and about the many harmless snakes, the myths about them, the biological role of snakes as rodent eaters and so on, then comes back to snakebite with a second victim who unlike Gopal does everything right (a girl of course). She keeps calm, goes to the hospital and gets antivenom serum.

Over 10,000 people die of snakebite in India every year and Snakebite! will hopefully be translated into the major regional languages and be widely shown. It has recently been approved for a Sunday afternoon showing on the national television network. Prof. V. Ramalingaswami, the Director General of the Indian Council for Medical Research saw the film at a showing in New Delhi and writes that "The film has all the ingredients of what I consider to be highly successful educational material. It should be shown throughout the country to the intelligestia and the lay public, to the providers of health care and to the recepients, indeed to the whole nation."

But please remain seated! We were very pleased to hear that Snakebite! won the Best Professional award at the 9th International Wildlife Film Festival in Missoula, Montana this year. The word is that Spielberg is worried.

BAREFOOT ENVIRONMENTAL SERVICES

For the past year, the Crocodile Bank has been carrying out a project to spread environmental awareness among students and teachers of Government schools in non-urban areas of Chinglepet District. So far, it has been operating without any funds at all, and only because of the enthusiasm of P. Rajendran, an assistant at the Crocodile Bank who puts in free time and effort. Clutching a set of foggy slides and a broken slide projector, Rajendran visits two or three schools a week and talks to an average group of 600 students, in Tamil, about wildlife and nature conservation. The talk most popular with school children is the one on snakes and snakebite treatment.

The response to this programme has been overwhelming, and Rajendran is in great demand by district schools, where the children and teachers have had no exposure to the subject. In view of this, the Crocodile Bank plans to approach the Department of Environment for funds for BEEP (Barefoot Environmental Education Programme) and if the money comes, then we will employ about 12 educated (and unemployed) youth from Vadanemmeli village, which is adjacent to the Crocodile Bank. Several of these boys have already done some education programmes in schools for the Croc Bank, and will help teach and guide the other participants.

A series of simple talks on wildlife and environmental issues will be written out in Tamil. Subjects will include the importance of planting trees, the proper use of wildlife resources, snakes and snakebite treatment and the value of forests. The 'Bees' (Barefoot Environmentalists) will be equipped with posters and literature to illustrate each talk. Additionally, they would also use live aids such as lizards, scorpions and snakes to help children and adults overcome their fear of these animals.

The aim will be to cover the over 3000 schools in Chinglepet District, with several visits to each school, each time with a different subject and programme. Each team of two Bees will deal with one programme, in which they will get a thorough education before they begin teaching. Workshops will be organised at the Crocodile Bank for several schools at a time on holidays, when 16 mm colour films will be shown and the students given a free tour around the Bank and the adjoining venom centre run by the Irula Snake-catcher's co-operative. Especially interested students may be taken on special trips, for example to the tree farm at Auroville.

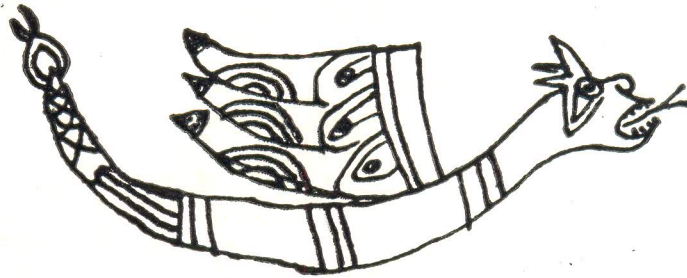
DONATIONS

Local : Rs. 15 annually

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Cheques should be made to

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HAMADRYAD is edited by Zai Whitaker.

Information presented here may be used elsewhere with acknowledgement to Hamadryad.